Properties of Exponential Functions

Graph each function as a transformation of its parent function.

1. $y = 2^{x+1}$

2. $y = -(2)^{x+1}$

3. $y = 5^{-x}$

4. $y = -0.1(5)^{-x}$

5. $y = 2(2)^{x+2}$

6. $y = 2^x + 1$

7. A cake is 190°F when you remove it from the oven. You must let it cool to 75°F before you can frost it. The table at the right shows the temperature readings for the cake.
   a. Given a room temperature of 68°F, what is an exponential model for this data set?
   b. How long must the cake cool before you can frost it?

Time (min)	Temp (°F)
0	190
5	149
10	122
15	104
20	92

Use the graph of $y = e^x$ to evaluate each expression to four decimal places.

8. e^2

9. $e^{-2.5}$

10. $e^{\frac{1}{3}}$

Properties of Exponential Functions

Find the amount in a continuously compounded account for the given conditions.

11. principal: $5000
annual interest rate: 6.9%
time: 30 yr

12. principal: $20,000
annual interest rate: 3.75%
time: 2 yr

13. How long would it take to double your principal at an annual interest rate of 7% compounded continuously?

14. Error Analysis A student says that the graph of $f(x) = 2^{x+3} + 4$ is a shift of 3 units up and 4 units to the right of the parent function. Describe and correct the student's error.

15. The isotope Hg-197 is used in kidney scans. It has a half-life of 64.128 h. After that time, half the isotope will have decayed. Write the exponential decay function for a 12-mg sample. Find the amount remaining after 72 h.

16. The isotope Sr-85 is used in bone scans. It has a half-life of 64.9 days. Write the exponential decay function for an 8-mg sample. Find the amount remaining after 100 days.

17. Suppose you invest $2000 at an annual interest of 5.5% compounded continuously.
a. How much will you have in the account in 10 years?
b. How long will it take for the account to reach $5000?

The parent function for each graph below is of the form $y = ab^x$. Write the parent function. Then write a function for the translation indicated.

18.
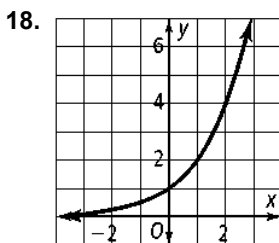
translation: left 3 units, up 1 unit

19.
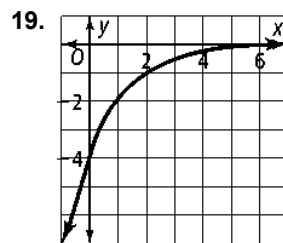
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